What is claimed is:

1. An object detection apparatus for detecting objects based on visual images captured by a self-moving unit,

wherein the apparatus executes global area image process for recognizing a motion field of the entire view associated to the self-motion and segregating an area incoherent with said motion field, and local area image process for calculating local flow information in the visual image in parallel, wherein the apparatus refers to results of both processes mutually to improve the accuracy of object detection.

2. An object detection apparatus for detecting objects based on visual images captured by a self-moving unit, the object detection apparatus comprising:

a sequential images output section for making a train of a first input image and a second input image sequential to the first input image and outputting said train;

a local area image processor for calculating local flows based on said first input image and said second input image;

an inertia information acquiring section for measuring self-motion of the unit to calculate inertia information thereof;

a global area image processor for using said inertia information to estimate global flow, which is a motion field of the entire view associated to the self-motion, using said global flow and said first input image to create a predictive image of said second input image and calculating differential image data, said differential image data being a difference between said predictive image and said second input image;

a figure-ground segregation section for using said differential image data

to refine said local flows, comparing the refined local flows with a predetermined threshold value to extract a figure candidate area, said figure candidate area being the area having a high probability of an object existing in the input image; and

an object presence/absence determination section for determining presence/absence of objects in said figure candidate area.

3. An object detection apparatus for detecting objects based on visual images captured by a self-moving unit, the object detection apparatus comprising:

a sequential images output section for making a train of a first input image and a second input image sequential to the first input image and outputting said train;

a local area image processor for calculating local flows based on said first input image and said second input image;

an inertia information acquiring section for measuring self-motion of the unit to calculate inertia information thereof;

a global area image processor for using said inertia information to estimate global flow, which is a motion field of the entire view associated to the self-motion, using said global flow and said first input image to create a predictive image of said second input image and calculating differential image data, said differential image data being a difference between said predictive image and said second input image;

a figure-ground segregation section for using said differential image data to refine said local flows,

an object presence/absence determination section for determining presence/absence of objects in said figure candidate area,

wherein said global area image processor uses the refined global flow

and said first input image to re-create a predictive image of said second input image and calculates a refined differential image data, said refined differential image data being a difference between the re-created predictive image and said second input image; and

wherein said figure-ground segregation section uses said refined differential image data to refine said local flows, compares the refined local flows with a predetermined threshold value to extract a figure candidate area, said figure candidate area being local areas having a high probability of objects existing in the input image.

4. The object detection apparatus according to claim 2 or 3, wherein said global area image processor employs a warp estimation method, said warp estimation method comprising creating said predictive image by warp-converting said first input image based on the shift of each pixel calculated from said global flow.

5. An object detection apparatus for detecting objects based on visual images captured by a self-moving unit, the object detection apparatus comprising:

a sequential images output section for making a train of a first input image, a second input image and a third input image sequential to the first input image and outputting said train;

a local area image processor for calculating local flows based on said first input image and said second input image;

a global area image processor for constructing an eigenspace for the input image in advance, projecting said first input image and said second input image on said eigenspace to create a predictive image of said third input image, and calculating differential image data which is a difference between said

predictive image and said third input image;

a figure-ground segregation section for using said differential image data to refine said local flows, comparing the refined local flows with a predetermined threshold value to extract a figure candidate area, said figure candidate area being the area having a high probability of objects existing in the input image; and

an object presence/absence determining section for determining a presence/absence of objects in said figure candidate area.

6. An object detection apparatus for detecting objects based on visual images captured by a self-moving unit, the object detection apparatus comprising:

a sequential images output section for making a train of a first input image, a second input image and a third input image sequential to the first input image and outputting said train;

a local area image processor for calculating local flows based on said first input image and said second input image;

an inertia information acquiring section for measuring motion of the unit and to calculate inertia information thereof;

a global area image processor for using said inertia information to estimate global flow, which is a motion field of the entire view associated to the self-motion, constructing an eigenspace for the input images and said global flow in advance, projecting said first input image and said second input image on said eigenspace to create a predictive image of said third input image and said global flow, and calculating differential image data which is a difference between said predictive image and said third input image;

a figure-ground segregation section for using said differential image data and said local flows to refine said global flow;

wherein said global area image processor uses the refined global flow and said second input image to re-create a predictive image of said third input image and calculates a refined differential image data, said refined differential image data being a difference between the re-created predictive image and said third input image;

wherein said figure-ground segregation section uses said differential image data to refine said local flows, compares the refined local flows with a predetermined threshold value to extract a figure candidate area, said figure candidate area being local areas having a high probability of objects existing in the input image; and

said object detection apparatus further comprising an object presence/absence determining section for determining a presence/absence of objects in said figure candidate area.

7. The object detection apparatus according to claim 2, 3, 5 or 6, wherein said local flows are optical flows calculated by applying Gabor filters to each local area in the input image.

8. The object detection apparatus according to claim 2, 3, 5 or 6, wherein said object presence/absence determining section performs clustering method of said figure candidate area, and determines that the object exists in the image when some figure candidate area still remains.

9. An object detection method for detecting objects based on visual images captured by a self-moving unit, the object detection method comprising:

making a train of a first input image and a second input image sequential to the first input image to output said train;

calculating local flows based on said first input image and said second

input image;

measuring self-motion of the unit to calculate inertia information thereof;

estimating global flow, which is a motion field of the entire view associated to the self-motion by using said inertia information;

creating a predictive image of said second input image by using said global flow and said first input image;

calculating differential image data, said differential image data being a difference between said predictive image and said second input image;

refining said local flows by using said differential image data;

comparing the refined local flows with a predetermined threshold value to extract a figure candidate area, said figure candidate area being the area having a high probability of an object existing in the input image; and

determining presence/absence of objects in said figure candidate area.

10. An object detection method for detecting objects based on visual images captured by a self-moving unit, the object detection method comprising:

making a train of a first input image and a second input image sequential to the first input image to output said train;

calculating local flows based on said first input image and said second input image;

measuring self-motion of the unit to calculate inertia information thereof;

calculating global flow, which is a motion field of the entire view associated to the self-motion, by using said inertia information;

creating a predictive image of said second input image by using said global flow and said first input image;

calculating differential image data, said differential image data being a

difference between said predictive image and said second input image;

refining said global flow by using said differential image data and said local flows;

re-creating a predictive image of said second input image by using the refined global flow and said first input image;

calculating a refined differential image data which is a difference between the re-created predictive image and said second input image;

refining said local flows by using the refined differential image data;

comparing the refined local flows with a predetermined threshold value to extract a figure candidate area, said figure candidate area being local areas having a high probability of objects existing in the input image; and

determining presence/absence of objects in said figure candidate area.

11. The object detection method according to claim 9 or 10, wherein said creating the predictive image further comprises warp-converting said first input image based on the shift of each pixel calculated from said global flow.

12. An object detection method for detecting objects based on visual images captured by a self-moving unit, the object detection method comprising:

making a train of a first input image, a second input image and a third input image sequential to the first input image to output said train;

calculating local flows based on said first input image and said second input image;

constructing an eigenspace for said input image in advance,

projecting said first input image and said second input image on said eigenspace to create a predictive image of said third input image;

calculating differential image data which is a difference between said predictive image and said third input image;

image data being a difference between the re-created predictive image and said third input image;

refining the local flows by using the differential image data;

comparing the refined local flows with a predetermined threshold value to extract a figure candidate area, said figure candidate area being local areas having a high probability of objects existing in the input image; and

determining a presence/absence of objects in said figure candidate area.

14. The object detection apparatus according to claim 9, 10, 12 or 13, wherein said local flows are optical flows calculated by applying Gabor filters to each local area in the input image.

15. The object detection apparatus according to claim 9, 10, 12 or 13, wherein said determining presence/absence of the object further comprises performing clustering method of said figure candidate areas and determining that the object exists in the image when some figure candidate area still remains.

refining said local flows by using said differential image data;

comparing the refined local flows with a predetermined threshold value to extract a figure candidate area, said figure candidate area being the area having a high probability of objects existing in the input image; and

determining a presence/absence of objects in said figure candidate area.

13. An object detection method for detecting objects based on visual images captured by a self-moving unit, the object detection method comprising:

making a train of a first input image, a second input image and a third input image sequential to the first input image to output said train;

calculating local flows based on said first input image and said second input image;

measuring self-motion of the unit to calculate inertia information thereof;

calculating global flow, which is a motion field of the entire view associated to the self-motion, by using said inertia information;

constructing an eigenspace for the input images and said global flow in advance;

projecting said first input image and said second input image on said eigenspace to create a predictive image of said third input image and said global flow;

calculating differential image data which is a difference between said predictive image and said third input image;

refining said global flow by using said differential image data and said local flows;

re-creating a predictive image of said third input image by using the refined global flow and said second input image;

calculating a refined differential image data, said refined differential